

Appln. S.N. 10/628,966
Amdt. dated February 12, 2007
Reply to Office Action of November 15, 2006
Docket No. 200209420-1

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REMARKS

The Office Action of November 15, 2006 has been received and carefully reviewed. It is submitted that, by this Amendment, all bases of rejection and objection are traversed and overcome. Upon entry of this Amendment, claims 1, 2, 4-19, 22-25, 27-42, 45 and 46 remain in the application. Claims 3 and 26 are cancelled herein. New claim 47 has been added in order to set forth an additional specific embodiment that the Applicants regard as their invention. Support for this new claim may be found throughout the specification as filed, at least at pages 5-10. Reconsideration of the claims is respectfully requested.

Claims 3 and 26 stand objected to under 37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. The Examiner states that both claims 3 and 26 recite that said black pigment is self-dispersed, while claims 1 and 24, from which claims 3 and 26 respectively depend, recite that the black ink includes at least one self-dispersed black pigment. The Examiner concludes that claims 3 and 26 fail to further limit the scope of the respective claim from which each depends, namely claims 1 and 26. Claims 3 and 26 have been canceled herein. As such, Applicants submit that the objections are moot.

Claims 1-19, 22-23 and 31-37 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention.

The Examiner states that claim 1 recites, "pigment-based inkjet ink set comprising a black ink and at least one dye-based color ink." According to the Examiner, claim 1 is confusing because it is not clear how a "pigment-based" ink set comprises a "dye-based" ink. The Examiner suggests, based on paragraph 13 of the specification, that the phrase be re-written as "inkjet ink set comprising a pigment-based black ink and at least one dye-based color ink." Claim 1 has been amended according to the Examiner's suggestion.

The Examiner states that claim 2, which depends from claim 1, recites, "said black pigment." The Examiner states that there is insufficient antecedent

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basis for this limitation in the claim and suggests changing the phrase to "said self-dispersed black pigment." Claim 2 has been amended according to the Examiner's suggestion.

The Examiner states that claims 8 and 31 each recite the formula for "said styrene-maleic anhydride copolymer." The Examiner states, however, that the scope of each of the claims is confusing given that the formula appears to be that of hydrolyzed styrene-maleic anhydride. The Examiner suggests that the phrase should be changed to "said hydrolyzed styrene-maleic anhydride copolymer" in both of the claims. In response thereto, claims 8 and 31 have been amended accordingly.

The Examiner further states that claims 8 and 31 each recite a general formula (I) that uses "X" and "Y." The Examiner states that the scope of each of the claims is confusing given that there is no disclosure of what "X" and "Y" represent. Applicants respectfully disagree with the Examiner because paragraph [0021] in the specification specifically states that that $X \approx 1$ and $Y \approx 22$. It is commonly known in organic chemistry that the number of monomer units in a polymeric structure is often represented by a subscript placed after a parenthesis or a bracket surrounding the monomer in the polymeric formula. The "X" and "Y" in formula (I) designates the number of units of the monomer(s), which can readily be determined from the Applicants' specification as filed. As such, it is submitted that this rejection of claims 8 and 31 under 35 U.S.C. 112, second paragraph, is erroneous, and withdrawal of the same is respectfully requested.

The Examiner states that claim 13 recites the limitation of "said styrene-maleic anhydride copolymer." The Examiner further states that there is insufficient antecedent basis for the limitation and suggests that the phrase should be changed to "said hydrolyzed styrene-maleic anhydride copolymer." The Examiner has presented the same argument for claims 14, 36 and 37. In response thereto, claims 13, 14, 36 and 37 have been amended according to the Examiner's suggestion.

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As such, Applicants submit that the rejection of claims 1-19, 22-23 and 31-37 under 35 U.S.C. § 112, second paragraph, has been traversed and overcome, and withdrawal of the same is respectfully requested.

Applicants have amended other claims to improve the readability and/or to implement the Examiner's suggestions in the other claims.

Claims 1-8, 13-18, 24-31 and 36-41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Koitabashi et al. (U.S. Patent Publication No. 2002/004317). The Examiner states that Koitabashi discloses an ink jet ink set comprising a first ink comprising an anionic dye, a second ink comprising anionic dye and a multivalent metal salt, and a third ink comprising a first pigment that is a self-dispersed pigment, a second pigment, dispersant that includes salt of styrene-maleic acid copolymer wherein the salt includes those obtained from alkali metal ions and ammonium ions. The first ink and second inks are color inks, while the third ink is a black ink.

The Examiner also states that "[g]iven that maleic anhydride hydrolyzes to maleic acid and given that the presently claimed hydrolyzed styrene-maleic anhydride is hydrolyzed by MOH base after polymerizing to form a salt of polycarboxylic acid (see paragraph 20 of the present specification), it is clear that Koitabashi et al.'s salt of styrene-maleic acid copolymer is equivalent to the presently claimed hydrolyzed styrene-maleic anhydride. In light of this, it is clear that this styrene-maleic acid salt copolymer would intrinsically interact with the multivalent salt of the dye-based second ink, which would intrinsically improve black-to-color bleed as presently claimed."

Thus, the Examiner concludes that while Koitabashi fails to exemplify the presently claimed ink, and that the claimed ink cannot be "clearly envisaged" from Koitabashi, as required to meet the standard of anticipation, it would have been obvious, in light of the overlap between the claimed ink and the ink disclosed by Koitabashi, to use ink which is both disclosed by Koitabashi and encompassed within the scope of the present claims, and thereby arrive at the claimed invention.

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Claim 1 is directed to an inkjet ink set *consisting essentially of* a black ink including at least one **self-dispersed** black pigment, and at least one dye-based color ink including a multivalent salt or an organic acid. The black ink further includes a hydrolyzed form of styrene-maleic anhydride copolymer that interacts with the multivalent salt or the organic acid and ultimately improves black-to-color bleed.

The ink set disclosed by Koitabashi includes three different inks. The black ink of Koitabashi includes a self-dispersible black pigment and a dispersible black pigment. One of the color inks of Koitabashi includes anionic dye, and the other includes a multivalent metal and an anionic dye. The amount of anionic dye in the second color ink is less than the amount in the first color ink.

In sharp contrast, Applicants' black ink as recited in claims 1 and 24 does not include a dispersible black pigment, and each of Applicants' color inks includes multivalent salts or organic acids. Applicants' ink set and method, as defined in amended claims 1 and 24 respectively, do not include the first color ink or the black ink described by Koitabashi.

For all the reasons stated above, it is submitted that Applicants' invention as defined in claims 1 and 24 (and in claims 2-8, 13-18, 25-31 and 36-41, which depend ultimately from one of claims 1 or 24) is not anticipated, taught or rendered obvious by the cited reference, either alone or in combination, and patentably defines over the art of record.

Claims 11-12 and 34-35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Koitabashi as applied to claims 1-8, 13-18, 24-31 and 36-41 above, and further in view of Momose et al. (U.S. Patent No. 6,695,900). The Examiner states that the difference between Koitabashi and the presently claimed invention is the requirement in the claims of the molecular weight of the dispersant (i.e., the salt of styrene-maleic acid copolymer). The Examiner further states that Momose discloses the use of a dispersant including the salt of styrene-maleic acid that possesses a weight average molecular weight of 100-50,000 and also discloses that if the molecular weight is lower, uneven printing

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occurs, and if the molecular weight is higher, the ink is not suitable for ink jet printing and uniform solid printing is not attained. The Examiner concludes that, in light of the motivation for using salt of styrene-maleic acid copolymer with specific weight average molecular weight disclosed by Momose, it therefore would have been obvious to use the copolymer with such molecular weight in Koitabashi in order to produce an ink that does not result in uneven printing and is suitable for ink jet printing, and thereby arrive at the claimed invention.

In response thereto, Applicants submit that claims 11-12 and 34-35, which are dependent from claims 1 and 24, respectively, are also patentable in view of the foregoing reasons. As previously described, Koitabashi teaches additional components in the black ink that are not present in Applicants' black ink, and also discloses an additional color ink that is not present in Applicants' ink set. As such, it is submitted that Koitabashi fails to anticipate or render obvious Applicants' invention as defined in amended claims 1 and 24. It is further submitted that Momose fails to supply the deficiencies of Koitabashi. As such, Applicants submit that claims 11-12 and 34-35 are also patentable in view of the cited references.

Claims 19, 22-23, 42 and 45-46 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Koitabashi as applied to claims 1-8, 13-18, 24-31 and 36-41 above, and further in view of Parazak (U.S. Patent No. 6,281,267). The Examiner states that the difference between Koitabashi and the presently claimed invention is the requirement of an organic acid. The Examiner states that Parazak discloses the use of an organic acid such as polyacrylic acid, glycolic acid, acetic acid, etc. in dye-based ink in order to aid in the pH and buffering capabilities of the ink. The Examiner concludes that in light of the motivation for using organic acid disclosed by Parazak, it therefore would have been obvious to use organic acid in the dye-based ink of Koitabashi in order to produce ink with suitable pH, and thereby arrive at the claimed invention.

Applicants again reiterate the above arguments pertaining to Koitabashi. It is further submitted that, as admitted by the Examiner, Parazak "requires the

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use of an acrylate polymer." As such, Parazak does not teach the ink set or the method defined in Applicants' amended claims 1 and 24. Applicants' black ink as recited in these claims consists essentially of a hydrolyzed form of styrene-maleic anhydride copolymer. Such use of this polymer is in sharp contrast to the teachings of the Parazak reference, which requires an acrylate polymer.

For all the reasons stated above, it is submitted that Applicants' invention as defined in claims 19, 22-23, 42 and 45-46 is not anticipated, taught or rendered obvious by the cited references, either alone or in combination, and patentably defines over the art of record.

Claims 1-19, 22-42, and 45-46 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Parazak in view of Zhu (U.S. Patent No. 5,889,083). The Examiner maintains her rejection over these references as provided in the previous office actions.

The Examiner addresses the claim language "consisting essentially of" as recited in claims 1 and 24 (as the claims were pending prior to this response). The Examiner states that, although Parazak requires the use of acrylate polymer, due to the open claim language of the word "comprising" used for the ink, it is clear that the ink is open to the inclusion of additional polymer, including an acrylate polymer. The Examiner further states that while it is recognized that the phrase "consisting essentially of" narrows the scope of the claims to the specified materials and those which do not materially affect the basic and novel characteristics of the claimed invention, absent a clear indication of what the basic and novel characteristics are, "consisting essentially of" is construed as equivalent to "comprising." Further, the burden is on Applicants to show that the additional ingredients in the prior art (i.e., acrylate resin) would in fact be excluded from the claims and that such ingredients would materially change the characteristics of Applicants' invention.

Applicants direct the Examiner's attention to the background section of Applicants' specification. In paragraphs [0010] - [0011] of the Applicants'

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specification as filed, Applicants point out the problem with using pigments and polymer dispersants for achieving black-to-color bleed control:

[T]here is no polymeric dispersant which, when reacted, rapidly builds viscosity and limits ink migration. As an example, a series of polymers of the **acrylic type** have been used to improve the [black-to-color bleed] and halo of the black pigmented inks.

However, adding polymeric dispersants to the pigment-based black inks in many cases leads to nozzle clogging and other reliability issues. Therefore, a need remains in further improving the polymeric dispersants. (emphasis added)

Thus, Applicants clearly state the potential problems with using "acrylic type" polymers, which include the acrylate resins used in the black ink composition of Parazak.

Furthermore, it is submitted that Applicants have further amended claims 1 and 24 to recite that the ink set consists essentially of (see amended claim 1) the black and color inks, and that each of the black and color inks consists essentially of (see amended claim 24) the respective components. It is submitted that neither Parazak nor Zhu teach such an ink set or method, in part because Parazak includes an acrylate polymer, and Zhu includes an additional wax. As previously stated, the acrylate polymer may cause nozzle clogging, and the addition of wax may (according to Zhu) affect the abrasion resistance.

As such, it is submitted that Applicants' invention as defined in claims 1-19, 22-42 and 45-46 is not anticipated, taught or rendered obvious by Parazak or Zhu, either alone or in combination, and patentably defines over the art of record.

In summary, claims 1, 2, 4-19, 22-25, 27-42, 45 and 46 remain in the application. New claim 47 has been added herein. It is submitted that, through this Amendment, Applicants' invention as set forth in these claims is now in a condition suitable for allowance.

Further and favorable consideration is requested. If the Examiner believes it would expedite prosecution of the above-identified application, the

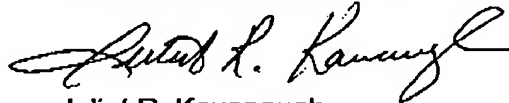
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Examiner is cordially invited to contact Applicants' Attorney at the below-listed telephone number.

Respectfully submitted,

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